Cellular reprogramming: a small molecule perspective.

Journal: Curr Opin Cell Biol

Publication Year: 2012

Authors: Baoming Nie, Haixia Wang, Timothy Laurent, Sheng Ding

PubMed link: 22959962

Funding Grants: Reprogramming of human somatic cells back to pluripotent embryonic stem cells

Public Summary:
The discovery that somatic cells can be reprogrammed to induced pluripotent stem cells (iPSCs) by the expression of a few transcription factors has attracted enormous interest in biomedical research and the field of regenerative medicine. iPSCs nearly identically resemble embryonic stem cells (ESCs) and can give rise to all cell types in the body, and thus have opened new opportunities for personalized regenerative medicine and new ways of modeling human diseases. Although some studies have raised concerns about genomic stability and epigenetic memory in the resulting cells, better understanding and control of the reprogramming process should enable enhanced efficiency and higher fidelity in reprogramming. Therefore, small molecules regulating reprogramming mechanisms are valuable tools to probe the process of reprogramming and harness cell fate transitions for various applications.

Scientific Abstract:
The discovery that somatic cells can be reprogrammed to induced pluripotent stem cells (iPSCs) by the expression of a few transcription factors has attracted enormous interest in biomedical research and the field of regenerative medicine. iPSCs nearly identically resemble embryonic stem cells (ESCs) and can give rise to all cell types in the body, and thus have opened new opportunities for personalized regenerative medicine and new ways of modeling human diseases. Although some studies have raised concerns about genomic stability and epigenetic memory in the resulting cells, better understanding and control of the reprogramming process should enable enhanced efficiency and higher fidelity in reprogramming. Therefore, small molecules regulating reprogramming mechanisms are valuable tools to probe the process of reprogramming and harness cell fate transitions for various applications.